

[JP,09-286958,A(1997)]

Japanese (PDF)

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FULL CONTENTS CLAIM + DETAILED DESCRIPTION TECHNICAL FIELD  
PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS  
OPERATION

[Translation done.]

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**Notes:**

1. Untranslatable words are replaced with asterisks (\*\*\*\*).
2. Texts in the figures are not translated and shown as it is.

Translated: 21:16:09 JST 06/22/2009

Dictionary: Last updated 06/08/2009 / Priority: 1. Chemistry / 2. Proper nouns / 3. Technical term

**CLAIM + DETAILED DESCRIPTION**

[Claim(s)]

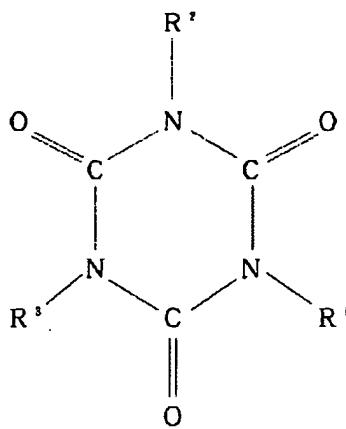
[Claim 1]A carbon number of an alkyl group is alkyl (meta) acrylate of 4-14. Copolymer 100 weight section which copolymerizes this alkyl (meta) acrylate and a copolymerizable vinyl monomer.

Five to mixture 70 weight section which consists of three ingredients of a nitrogen containing compound and a metal oxide which are denoted by polyphosphoric acid ammonium and the following constitutional formula.

It is the fire-resistant adhesion film provided with the above, and is characterized by percentage of stress relaxation of 20 minutes after [ when this fire-resistant adhesion film is elongated 100% ] being not less than 50%.

[Chemical formula 1]

[Translation done.]



(式中、R¹、R²、R³はそれぞれ水素または炭素数1～16個のヒドロキシアルキル基、ジヒドロキシアルキル基、ヒドロキシリール基、ジヒドロキシアリール基を表す。)

[Claim 2] A carbon number of an alkyl group is alkyl (meta) acrylate of 4-14. Copolymer 100 weight section which copolymerizes this alkyl (meta) acrylate and a copolymerizable vinyl monomer.

Five to phosphorus compound 50 weight section, and two to thermal expansion nature graphite 15 weight section.

It is the fire-resistant adhesion film provided with the above, and is characterized by percentage of stress relaxation of 20 minutes after [ when this fire-resistant adhesion film is elongated 100% ] being not less than 50%.

[Claim 3] A carbon number of an alkyl group is alkyl (meta) acrylate of 4-14. Copolymer 100 weight section which copolymerizes this alkyl (meta) acrylate and a copolymerizable vinyl monomer.

Five to polyphosphoric acid ammonium 70 weight section, and/or two to red phosphorus 30 weight section.

It is the fire-resistant adhesion film provided with the above, and is characterized by percentage of stress relaxation of 20 minutes after [ when this fire-resistant adhesion film is elongated 100% ] being not less than 50%.

[Claim 4] A carbon number of an alkyl group Alkyl (meta) acrylate of 4-14, As opposed to copolymer 100 weight section which copolymerizes this alkyl (meta) acrylate and a copolymerizable vinyl monomer, one of Claims 1-3, wherein 10-50 volume % content of a particle with a mean particle diameter of 1-150 micrometers or hollow particles is done with 0.5 to 175 weight section, or a volume fraction -- a fire-resistant adhesion film of a description.

[Claim 5] Fire-resistant adhesive tape characterized by any of Claims 1-4, or a thing of a fire-resistant adhesion film of a description for which an adhesive layer is provided in the whole surface at least.

#### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a fire-resistant adhesion film and a tape.

[0002]

[Description of the Prior Art] Conventionally, polyethylene foam, chloroprene foam,

urethane foam, acrylic foam, etc. are used as a substrate, and the adhesive tape which provided adhesive layers, such as acrylic and a rubber system, in the both sides is used in a car, a household appliance, OA equipment, the housing building-materials field, etc. Since two fields can paste up easily the pressure sensitive adhesive double coated tape which used this foam as the substrate with a non-solvent, and the percentage of stress relaxation of this substrate is large, a substrate changes into this rugged surface, it sticks and it can moreover paste up even if an adherend has comparatively detailed unevenness, it is used in various fields. However, the cohesive failure hardness of the foam substrate was low, and, for this reason, there was a problem that adhesive strength determined by cohesive failure hardness, such as shear strength and peel strength, was usually fully hard to be obtained. Then, the adhesive tape which makes alkyl (meta) acrylate a principal component had high disruptive strength, and these people invented that high adhesive strength was moreover obtained, and applied as JP,H7-90028,A.

[0003]

[Problem to be solved by the invention]The field which uses this adhesive tape, i.e., a car, a household appliance, OA equipment, and the housing building-materials field require the fire retardancy of this adhesive tape in many cases. However, there is a problem that the pressure sensitive adhesive double coated tape which uses foam as a substrate, and the adhesive tape which makes said alkyl (meta) acrylate a principal component are inferior to fire retardancy. Although the method of adding a containing halogen compound is generally used as a method of fire-retardancy-izing resin, a lot of harmful smoke at the time of combustion is generated, the corrosiveness to an instrument, the hazardous property to the human body, etc. have been a problem, and the fire retardancy which does not contain halogen is required.

[0004]Then, the purpose of this invention is to provide the fire-resistant adhesion film and tape which made fire retardancy the adhesive tape which makes a principal component the alkyl (meta) acrylate from which high shear strength and adhesive strength are obtained without including halogen.

[0005]

[Means for solving problem]The thing which is characterized by that the thing about fire-resistant adhesion SUIRUMU whose this invention is the fire-resistant adhesion film in which the constituent was fabricated in the shape of a film, and whose percentage of stress relaxation of 20 minutes after [ when this fire-resistant adhesion film is elongated 100% ] is not less than 50% comprises the following and which attains the above-mentioned purpose.

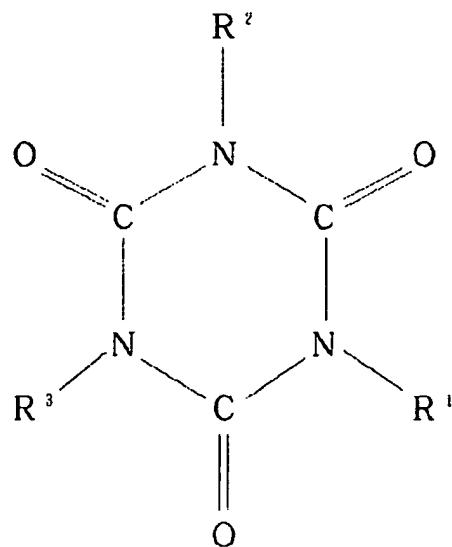
The carbon number of an alkyl group of the invention according to claim 1 is alkyl (meta) acrylate of 4-14.

Copolymer 100 weight section which copolymerizes this alkyl (meta) acrylate and a copolymerizable vinyl monomer.

Five to mixture 70 weight section which consists of three ingredients of the nitrogen containing compound and metal oxide which are denoted by polyphosphoric acid ammonium and the following constitutional formula.

[0006]

[Chemical formula 2]



(式中、R<sup>1</sup>、R<sup>2</sup>、R<sup>3</sup>はそれぞれ水素または炭素数1～16個のヒドロキシアルキル基、ジヒドロキシアルキル基、ヒドロキシリール基、ジヒドロキシリール基を表す。)

[0007]The carbon number of an alkyl group the invention according to claim 2 The alkyl (meta) acrylate of 4-14, Copolymer 100 weight section which copolymerizes this alkyl (meta) acrylate and a copolymerizable vinyl monomer, The constituent which consists of five to phosphorus compound 50 weight section and two to thermal expansion nature graphite 15 weight section is the fire-resistant adhesion film fabricated in the shape of a film, and the percentage of stress relaxation of 20 minutes after [ when this fire-resistant adhesion film is elongated 100% ] is related with the fire-resistant adhesion film which is not less than 50%.

[0008]The carbon number of an alkyl group the invention according to claim 3 The alkyl (meta) acrylate of 4-14, Copolymer 100 weight section which copolymerizes this alkyl (meta) acrylate and a copolymerizable vinyl monomer, The constituent which consists of five to polyphosphoric acid ammonium 70 weight section and/or two to red phosphorus 30 weight section is the fire-resistant adhesion film fabricated in the shape of a film, The percentage of stress relaxation of 20 minutes after [ when this fire-resistant adhesion film is elongated 100% ] is related with the fire-resistant adhesion film which is not less than 50%.

[0009]the invention according to claim 4 -- one of Claims 1-3 -- in the invention of a description, The carbon number of an alkyl group The alkyl (meta) acrylate of 4-14, As opposed to copolymer 100 weight section which copolymerizes this alkyl (meta) acrylate and a copolymerizable vinyl monomer, As for 10-50 volume % content, a particle with a mean particle diameter of 1-150 micrometers or hollow particles are related with the fire-resistant adhesion film carried out with 0.5 to 175 weight section, or a volume fraction.

[0010]the invention according to claim 5 -- Claims 1-4 -- it is related with the fire-resistant adhesive tape of the fire-resistant adhesion film of a description in which the adhesive layer is provided in the whole surface at least either.

[0011]As for the alkyl (meta) acrylate of 4-14, the carbon number used for this invention says the ester obtained from the univalent alcohol, acrylic acid, or methacrylic acid in which a carbon number has an alkyl group of 4-14. The Reason this carbon number uses the alkyl (meta) acrylate of 4-14 is that the glass transition

point of an alkyl (meta) Acryl acid is high in it being three or less carbon number, therefore there is no tackiness at ordinary temperature. With a carbon numbers of 15 or more alkyl (meta) acrylate is because a glass transition point becomes high and sufficient tackiness is not acquired at ordinary temperature. Also in this alkyl (meta) acrylate, the alkyl (meta) acrylate of 4-12 has an especially preferred carbon number. As this compound, n-butyl (meta) acrylate, hexyl (meta) acrylate, There are alkyl (meta) acrylate, such as 2-ethylhexyl (meta) acrylate, isoctyl (meta) acrylate, n-octyl (meta) acrylate, isononyl (meta) acrylate, decyl (meta) acrylate, and dodecyl (meta) acrylate, etc.

[0012] And alkyl (meta) acrylate, such as this, may be used alone, and may mix and use two or more sorts. Usually especially. [ balance / tackiness and coherent ] [ use / glass transition temperature (Tg) / the alkyl (meta) acrylate not more than -50 \*\* ] It is preferred that this glass transition temperature (Tg) makes a principal component the alkyl (meta) acrylate not more than -50 \*\*, and uses other alkyl (meta) acrylate together. When using together in this way, the alkyl (meta) acrylate of the carbon numbers 1-3 can also be used.

[0013] The content of the alkyl (meta) acrylate of these carbon numbers 4-14 receives monomer 100 weight section in a copolymer suitably, Since the high shear strength in which the force of coagulation becomes low too much will not be obtained if the force of coagulation becomes it strong that it is less than 50 weight % too much, a pressure-sensitive adhesive property falls and it exceeds 98 weight %, 50 to 98 weight % is preferred. It is 70 to 95 weight % preferably.

[0014] Although there are various alkyl (meta) acrylate used for this invention and copolymerizable vinyl monomers, their polar group containing vinyl monomer is preferred. As this polar group containing vinyl monomer, acrylic acid (meta), maleic acid, The carboxyl group containing vinyl monomer which has a double bond in intramoleculars, such as fumaric acid, itaconic acid, or these anhydride, (Meta) Acrylonitrile, N-vinyl pyrrolidone, N-vinylcaprolactam, Acryloyl morpholine, acrylamide (meta), dimethylaminoethyl (meta) acrylate, Nitrogen content vinyl monomers, such as diethyl aminoethyl (meta) acrylate and dimethylaminopropyl (meta) acrylamide, There are hydroxyl group content vinyl monomers, such as 2-hydroxyethyl (meta) acrylate, 4-hydroxy butyl (meta) acrylate, polyoxyethylene (meta) acrylate, polyoxypropylene (meta) acrylate, and caprolactone denaturation (meta) acrylate, etc.

[0015] As other alkyl (meta) acrylate and a copolymerizable vinyl monomer, vinyl acetate, vinyl propionate, styrene, isoboronyl (meta) acrylate, etc. are usable. The high shearing force in which the force of coagulation becomes it low suitably that it is less than 2.0 weight % too much is not acquired, and at 50 weight % or more, the force of coagulation is too high, and since a pressure-sensitive adhesive property is spoiled, 2 to 50 weight % is preferred [ the content of the above-mentioned alkyl (meta) acrylate and a copolymerizable vinyl monomer ].

[0016] A polyfunctional vinyl monomer can be added in order to acquire the force of coagulation outstanding besides the above-mentioned component. As this polyfunctional vinyl monomer, hexanediol di(metha)acrylate, Ethylene glycol di(metha)acrylate, poly ethylene glycol di(metha)acrylate, Propyleneglycol di(meth) acrylate, poly propyleneglycol di(meth) acrylate, Neopentyl glycol di(metha)acrylate, pentaerythritol di(metha)acrylate, Pentaerythritol bird (meta) acrylate, trimethylolpropane bird (meta) acrylate, allyl (meta) acrylate, vinyl (meta) acrylate, divinylbenzene, epoxy (meta) acrylate, etc. are preferred.

[0017] Although the amount of the above-mentioned polyfunctional vinyl monomer used may change with kinds and may be proper, Usually, the force of coagulation which crosslinking density is low and needs it at less than 0.01 weight section is not acquired, if one weight section is exceeded, crosslinking density will become high, the force of coagulation is too high, and since a pressure-sensitive adhesive property

is spoiled, 0.01 to 1 weight section is 0.02 to 0.8 weight section desirable still more preferably. If there are this alkyl (meta) acrylate, this alkyl (meta) acrylate, a copolymerizable monomer, and necessity, Although the method of making it copolymerize by a thermal polymerization initiator, the method of adding a photopolymerization initiator, irradiating with radiation and making it copolymerize, etc. are mentioned, for example, [ as a method of making the mixed monomer which mixed the polyfunctional vinyl monomer etc. copolymerizing, and obtaining a copolymer ] A photopolymerization method is the most preferred at the point that it is collectively obtained by what has comparatively thick thickness by applying and carrying out photopolymerization of the mixed monomer which added the above-mentioned photopolymerization initiator on a substrate.

[0018]What is necessary is to add a photopolymerization initiator into a mixture, in order to carry out photopolymerization, and just to irradiate with lights, such as ultraviolet radiation and visible light. [ as a photopolymerization initiator used here ] The 4-(2-hydroxy ethoxy) phenyl (2-hydroxy-2-propyl) ketone "DAROKYUA 2959: Ciba-Geigy make";alpha-hydroxy- alpha, alpha'-dimethyl- acetophenone "DAROKYUA 1173:Ciba-Geigy make"; Methoxy acetophenone, 2,2 -- acetophenone series [, such as - dimethoxy- 2-phenylacetophenone "IRGACURE 651:Ciba-Geigy make";2-hydroxy-2-cyclohexyl acetophenone "IRGACURE 184:Ciba-Geigy make", ]; -- ketal system [, such as benzyl dimethyl ketal ]; In addition, halogenation ketone, acyl phosphine oxide, acyl phosphonate, etc. can be mentioned. This photopolymerization initiator, [ less than 0.01 weight section ] Since a radical yield will increase, molecular weight will fall and the required force of coagulation will not be acquired if polymerization conversion falls, only a copolymer with a tight monomer smell is obtained and five weight sections are exceeded, 0.01 to 5 weight section is 0.05 to 3 weight section preferably [ it is desirable and also ].

[0019]Although various things can be used as polyphosphoric acid ammonium used for the invention according to claim 1, the thing of 200-1000 has a preferred degree of polymerization, and a poorly soluble thing is still more preferred in water with the fluid good powder by which the surface was covered with melamine/formaldehyde resins. [ as a nitrogen containing compound used for the invention according to claim 1 ] Isocyanuric acid, mono (hydroxymethyl) isocyanurate, tris (hydroxymethyl) isocyanurate, Mono (dihydroxymethyl) isocyanurate, bis(hydroxymethyl) isocyanurate, Bis(dihydroxymethyl)isocyanurate, tris (dihydroxymethyl) isocyanurate, Mono- (2-hydroxyethyl) isocyanurate, bis(2-hydroxyethyl)isocyanurate, Tris (2-hydroxyethyl) isocyanurate, tris (1, 2-dihydroxyethyl) isocyanurate, Tris (3-hydroxypropyl) isocyanurate, tris (2,3-dihydroxy propyl) isocyanurate, Tris (4-hydroxy butyl) isocyanurate, tris (3,4-dihydroxy butyl) isocyanurate, Tris (8-hydroxy octyl) isocyanurate, tris (4-hydroxyphenyl) isocyanurate, There are tris (2,4-dihydroxy phenyl) isocyanurate, tris (2,3-dihydroxy phenyl) isocyanurate, etc., and independent, two or more sorts use together, and it is used. A fire-resistant viewpoint to tris (2-hydroxyethyl) isocyanurate is especially preferred also in it.

[0020]Although there are various things as a metal oxide used for the invention according to claim 1, as an especially suitable thing, magnesium oxide, aluminium oxide, titanium oxide, nickel oxide, zinc oxide, etc. are mentioned, and especially titanium dioxide is preferred also in this. In the invention according to claim 1, the above-mentioned polyphosphoric acid ammonium, a nitrogen containing compound, and a metal oxide are used together and begun, and good fire retardancy is acquired. Although the mixing ratio at this time may be proper, the range of polyphosphoric acid ammonium:nitrogen containing compound:metal oxide =40-94.9 weight %:5-40 weight %:0.1-20 weight % is preferred. When the carbonization layer burned and carbonized expands, these three component systems demonstrate fire retardancy and such composition ratios make them this range, their dilation of the remainder after heating is large, and since sufficient fire retardancy is acquired, they are preferred.

[0021]The ratio with the copolymer which makes a principal component this three ingredients and alkyl (meta) acrylate carries out 5-70 weight-section use to copolymer 100 weight section which makes alkyl (meta) acrylate a principal component. This is because adhesive strength will fall if sufficient fire retardancy is not acquired with their being less than five weight sections and 70 weight sections are exceeded. It is 20 to 40 weight section still more preferably ten to 50 weight section preferably.

[0022][ as a phosphorus compound used for the invention according to claim 2 ] Phosphoric ester, such as triphenyl phosphate and octyldiphenyl phosphorate, trioctyl phosphate, and tricresyl phosphate; Sodium phosphate, The hydrate of metal salt, such as phosphoric acid metal salt, such as potassium phosphate, magnesium phosphate, zinc phosphate, and aluminum phosphate, or this; Ammonium phosphate, Polyphosphoric acid ammonium, the phosphate of ethylenediamine, the phosphate of diethylenetriamine, There are phosphonic acid, such as a salt with phosphoric acid, such as phosphate of guanidine, ammonia, or amine, phosphine, phosphine oxide and t-butyl phosphonic acid, and phenylphosphonic acid, melamine denaturation polyphosphoric acid ammonium, red phosphorus, etc. This may be used independently and two or more kinds may be used together.

[0023]Since the fire retardancy which was easy handling, and was excellent also in the above-mentioned phosphorus compound is acquired, it is desirable. [ of especially polyphosphoric acid ammonium ] Although various things can be used as this polyphosphoric acid ammonium, the thing of 200-1000 has a preferred degree of polymerization, the surface is [ that it is easy to be the flowability covered with melamine/formaldehyde resins ] still more powdered, and a poorly soluble thing is preferred in water. The amount of this phosphorus compound used carries out 5-50 weight-section use to copolymer 100 weight section. This is because adhesive strength will fall if fire retardancy sufficient in less than five weight sections is not acquired and 50 weight sections are exceeded. It is 15 to 30 weight section still more preferably ten to 40 weight section preferably.

[0024]The graphite which will expand if it heats can be used as thermal expansion nature graphite used for the invention according to claim 2. Powder, such as natural scale-like graphite, pyrolysis graphite, and kish graphite, for example, concentrated sulfuric acid, The crystalline compound which processed with oxidants, such as inorganic acid, such as nitric acid and selenic acid, concentrated nitric acid and perchloric acid, a perchlorate, permanganate, dichromate, and hydrogen peroxide, made intercalated graphite generate, and has maintained the carbonaceous lamellar structure is preferred.

[0025]It is preferred to use further the thermal expansion nature graphite produced by above-mentioned carrying out acid treatment in this invention with ammonia, aliphatic series low-grade amine, an alkali metal compound, an alkaline earth metal compound, etc., carrying out neutralization treatment. As the above-mentioned aliphatic series low-grade amine, there are monomethylamine, dimethylamine, trimethylamine, ethylamine, propylamine, a butylamine, etc. As the above-mentioned alkali metal compound and an alkaline earth metal compound, there are hydroxides, such as KARUUMU, sodium, calcium, barium, and magnesium, an oxide, carbonate, sulfate, organic acid salt, etc.

[0026]Since sufficient fire retardancy will not be acquired if small, thermal expansion nature graphite of 100 times or more has [ the coefficient of cubical expansion at the time of the above-mentioned thermal expansion nature graphite expanding ] a preferred coefficient of cubical expansion at the time of carrying out rapid heating of this thermal expansion nature graphite to not less than 800 \*\*. The measuring method of this coefficient of cubical expansion puts 1 ml of thermal expansion nature graphite into the crucible with a content volume of 100 ml made from platinum, and feeds it into the electric furnace beforehand heated at not less than 800 \*\*. After an injection, after 30 seconds pass, it cools radiationally until it takes out the crucible made from

platinum and becomes a room temperature, and the expansion coefficient of a volume is measured. When it has become more than the quantity with which the thermal expansion nature graphite which expanded with heating fills crucible content volume completely, it is a 100 or more-time coefficient of cubical expansion.

[0027]As for the grain size of the above-mentioned thermal expansion nature graphite, since dispersibility will worsen and the physical properties of the constituent obtained will fall if large [ if fine, a coefficient of thermal expansion will become small and sufficient fire retardancy will not be acquired, but ], 50-200 meshes are preferred. The amount of this thermal expansion nature graphite used is two to 15 weight section to copolymer 100 weight section. This is because adhesive strength will fall if fire retardancy sufficient in less than two weight sections is not acquired and 15 weight sections are exceeded. It is five to 10 weight section still more preferably three to 12 weight section preferably.

[0028]The polyphosphoric acid ammonium used for the invention according to claim 3 is the same as the polyphosphoric acid ammonium used for the invention according to claim 1. The amount of this polyphosphoric acid ammonium used is five to 70 weight section to copolymer 100 weight section. This is because adhesive strength will fall if fire retardancy sufficient in less than five weight sections is not acquired and 70 weight sections are exceeded. It is ten to 40 weight section still more preferably five to 50 weight section preferably. Although a commercial thing may be sufficient as the red phosphorus used for the invention according to claim 3, what coated the surface of red phosphorus grains with resin from a point of moisture resistance and the safety (spontaneous ignition by an impact) on handling is preferred. The amount of the above-mentioned red phosphorus used carries out 2-30 weight-section use to copolymer 100 weight section. This is because adhesive strength will fall if fire retardancy sufficient in less than two weight sections is not acquired and 30 weight sections are exceeded.

[0029]In this invention, various things can be added to a constituent besides the above-mentioned compound. For example, a tackifier may be added in order to strengthen tackiness of this constituent. as a suitable tackifier -- rosin system resin, denaturation rosin system resin, terpene series resin, terpene phenol system resin, C5 system, and C9 system -- they can use it, hydrogenation things, such as petroleum resin, a cumarone resin, etc. and this, etc. being able to be independent, or combining. However, since a rate of polymerization may fall or molecular weight may fall when blending this etc. with a photopolymerization constituent and carrying out a photopolymerization reaction, it is necessary to adjust suitably quantity, such as a chain transfer agent and a polyfunctional vinyl monomer, at this time.

[0030]Although the fire-resistant adhesion film of this invention fabricates the above-mentioned constituent in the shape of a film and it is characterized by the percentage of stress relaxation of 20 minutes after [ when this fire-resistant adhesion film is elongated 100% ] being not less than 50%, measurement of this percentage of stress relaxation is performed by the method shown below. That is, shall pull, an up-and-down distance between zippers shall be 40 mm using a testing machine, it is made to elongate 100% with the film width of 20 mm, and the residual stress of 20 minutes after is measured. The value which reduced the residual stress 20 minutes after the initial maximum stress in that case is indicated to be percentage of stress relaxation by the percentage "initial maximum stress of x(residual stress 20 minutes after initial maximum stress-) 100/" of the value acquired by carrying out Nozoki by the initial maximum stress.

[0031]The percentage of stress relaxation of the fire-resistant adhesion film of this invention is not less than 50%, and is not less than 60% preferably. This stress relaxation nature plays the important role of adhesive tape. That is, in order to ease a stress when it changes and pastes up according to this rugged surface and a zygote tears off, even if an adherend has comparatively detailed unevenness if percentage of

stress relaxation is large when a zygote is pasted up on an adhesion film or a tape, the junction hardness as the whole zygote becomes high. If the percentage of stress relaxation of an adhesion film or a tape is small, it will not change according to an adherend, a stress when tearing off between a zygote and adhesive tape will concentrate on a part, and junction hardness will become low.

[0032]When the percentage of stress relaxation of the fire-resistant adhesion film in the invention according to claim 1 to 3 is not less than 50%, it can be used as it is, but when percentage of stress relaxation is less than 50%, it is necessary to enlarge percentage of stress relaxation by a method suitably.

[0033]The desirable method of enlarging this percentage of stress relaxation is a method of making particles and hollow particles containing in a constituent. Like the Claim 4 description, the most desirable method carries out 0.5-175 weight-section content of the particles of 1-150 micrometers of average grains, or the hollow particles to copolymer 100 weight section, or 10-50 volume % content is the method of carrying out in a volume fraction. [ as a particle with a mean particle diameter of 1-150 micrometers used here or hollow particles ] Non-in-a-plane sky grains, such as a glass balloon, a milt balloon, and fly ash balloons, Polymethylmethacrylate and an acrylonitrile vinylidene chloride copolymer, Inorganic particles, such as synthetic resin hollow particle; glass beads and silica beads, such as polystyrene and a phenol resin, and synthetic mica; organic particles, such as polyethylacrylate, polyurethane, polystyrene, polyethylene, and polypropylene, are mentioned. If it exceeds the mean particle diameter of less than 1 micrometer, and 150 micrometers, since a high stress relaxation characteristic is not obtained, the mean particle diameter of 1-150 micrometers will be used.

[0034]A particle with a mean particle diameter [ this ] of 1-150 micrometers or hollow particles carry out 0.5-175 weight-section use to copolymer 100 weight section. In hollow particles with small specific gravity, 0.7 to 10 weight section is preferred, and ten to 60 weight section has preferred specific gravity in around one non-in-a-plane sky particle or synthetic resin particles. By two or more heavy inorganic particles, 70 to 150 weight section has preferred specific gravity. In a volume fraction, 10-50 volume % content of is done. When this volume fraction exceeds less than 10 volume % and 50 volume %, a high stress relaxation characteristic is not obtained.

[0035]Although still more powerful adhesive strength may be required of what fabricated the constituent of the invention according to claim 1 to 4 in the shape of a film depending on a use although itself has tackiness, and tackiness may be insufficient for it, in this case, it is good like the Claim 5 description to provide an adhesive layer in the whole surface or both sides. As a binder used for this adhesive layer, the binder known conventionally [ , such as acrylic, a rubber system, and a silicone series, ] can be used. Which a radiation-curing [ which is hardened with radiation, such as a solvent type, a moisture powder type, a hot melt type, ultraviolet radiation, and electron rays, ] type type may be sufficient as this binder. When this binder is a hot melt type or an ultraviolet curing type, a coating can be directly carried out on what fabricated the constituent of the invention according to claim 1 to 4 in the shape of a film. When this binder is a solvent type or a moisture powder type, it is good to coat a binder, to dry, to make an adhesive layer form on the film which performed mold release treatment, and to carry out transcription lamination on the adhesion film according to claim 1 to 4 after that.

[0036]In order to reinforce the adhesive strength of this adhesive layer and the adhesion film according to claim 1 to 4, an adhesive strength enhancement layer may be provided between adhesive tape and an adhesive layer. [ as a compound used for this adhesive strength enhancement layer ] There are polyamine compound, a polyfunctional isocyanate compound, a polyfunctional epoxy compound, a polyfunctional carbodiimide compound, a polyfunctional oxazoline compound,

chloroprene, chlorination natural rubber, a compound containing a methylol group, a methoxymethyl compound, etc. [ the copolymer which copolymerizes alkyl (meta) acrylate, this alkyl (meta) acrylate, and a copolymerizable vinyl monomer in this invention, and the invention according to claim 1 ] The constituent which consists of polyphosphoric acid ammonium, a nitrogen containing compound, and a metal oxide, [ the invention according to claim 2 ] The constituent which consists of a phosphorus compound and thermal expansion nature graphite, [ the invention according to claim 3 ] The constituent in which the constituent which consists of polyphosphoric acid ammonium and/or red phosphorus contained particles or hollow particles further in the constituent according to claim 1 to 3 in the invention according to claim 4 is fabricated in the shape of a film, respectively.

[0037]Although the method of fabricating this constituent in the shape of a film may carry out melting of the copolymer, may add each flame retarder and thing required in addition to this in this, may mix them uniformly and it may fabricate in the shape of a film, After adding each flame retarder and thing required in addition to this and mixing uniformly in vinyl monomers, such as alkyl (meta) acrylate, fabricate to a sheet shaped, vinyl monomers, such as acrylic (meta) acrylate, are made to copolymerize, and a fire-resistant adhesion film may be obtained. As this polymerization method, a photopolymerization method is preferred.

[0038]If the best method of manufacturing the fire-resistant adhesion film or tape of this invention with a photopolymerization method is explained still in detail, If there is necessity with alkyl (meta) acrylate, this alkyl (meta) acrylate, a copolymerizable vinyl monomer, and a photopolymerization initiator, [ a polyfunctional vinyl monomer, and a tackifier etc. and the invention according to claim 1 ] Add and polyphosphoric acid ammonium, a nitrogen containing compound, and a metal oxide, [ the invention according to claim 2 ] Add and a phosphorus compound and thermal expansion nature graphite, [ the invention according to claim 3 ] Add polyphosphoric acid ammonium or/and red phosphorus, and further, [ the invention according to claim 4 ] If the above-mentioned flame retarder added, and also particles or hollow particles are added further, it coats to a with a [ the thickness of a request of this on a mold release treatment film ], for example, thickness (50 micrometers - 5 mm), sheet shaped and there is necessity, Besides the mold releasing film for a cover is stuck, and if it irradiates with light from on this and vinyl monomers, such as the above-mentioned alkyl (meta) acrylate, are polymerized, a fire-resistant adhesion film can be manufactured. In the invention according to claim 5, an adhesive layer is provided at these whole surface or both sides. When the constituent of the shape of this film is tape shape, the constituent of the shape of this film serves as fire-resistant adhesive tape as it is, and when it is not tape shape, if it fabricates to tape shape, fire-resistant adhesive tape can be manufactured.

[0039]When coating to a with a [ the thickness of this request ], for example, thickness (50 micrometers - 5 mm), sheet shaped, and viscosity is too low and does not become a sheet of desired thickness, it is necessary to thicken. For example, when the thickness of a sheet is 100 micrometers or less, 1000 c.p.s. and the TI value can coat about 1.5, but in the case of the thickness of the sheet beyond it, it is necessary to make it hyperviscosity. As a means to thicken, it is good to dissolve thermoplastics, such as elastomers, such as acrylic rubber, nitrile rubber, and styrene isoprene styrene (SIS), polymethylmethacrylate (PMMA), and polystyrene (PSt), etc. into vinyl monomer mixture. It can be made to thicken even if it mixes silica, alumina, etc. with a mean diameter of 5 micrometers or less. Without adding thermoplastics, silica, etc. as mentioned above, even if it polymerizes a part of vinyl monomer, it can thicken. In this case, since generation of a micro gel can protect if it is made to copolymerize with a catalyst etc. before adding a polyfunctional vinyl monomer, it is desirable. If this micro gel generates, when coating, it will become a cause of a poor development of a stripe etc. Vinyl monomer mixture by which a partial polymerization is carried

out should be carried out to 60% from 1.5% of total monomers. Required viscosity is not obtained, and viscosity becomes high too much and it stops being able to carry out the coating of it in the shape of a film at not less than 60% in 1.5% or less.

[0040]As lamps used for photopolymerization, although it changes with kinds of photopolymerization initiator, what has emission distribution with a light wavelength of 400 nm or less is usually used. As a light source which emits emission distribution with a light wavelength [ this ] of 400 nm or less, a low pressure mercury lamp, an inside pressure mercury-vapor lamp, an ultrahigh pressure mercury lamp, a chemical lamp, a Wood's glass lamp, a microwave excitation mercury-vapor lamp, a metal-halide lamp, etc. can be mentioned. Also in this, it emits light efficiently in the light of the activity wavelength area of a photopolymerization initiator, and since there is little optical absorption of constituents other than a photopolymerization initiator, light penetrates a chemical lamp and it can manufacture the constituent of the shape of a film of a high thick film to an inside, it is preferred. Although the light irradiation hardness to the constituent of the shape of a film with the above-mentioned lamp is a factor which influences the degree of polymerization of the polymer obtained and it is suitably controlled for every performance of the constituent of the shape of a target film, When the cleft type photopolymerization initiator which has the usual acetophenone group is blended, the light intensity of the wavelength area (although it changes with photopolymerization initiators, light (365 nm - 420 nm) is usually used) where the range is effective in the photolysis of a photopolymerization initiator has preferred 0.1-100mW/cm<sup>2</sup>.

[0041]The above-mentioned photopolymerization has a reaction checked by the oxygen which dissolves in oxygen in the air, and a film-like constituent. For this reason, the technique from which light irradiation removes oxygen has necessity. As that technique, it inserts from both sides with a mold release treatment film and the mold releasing films for a cover, such as polyethylene terephthalate (PET) which carried out surface mold release treatment of the film-like constituent, and light has the method of irradiating through this film. It may be made to react in the inert zone which has the light transmittance state window which substituted oxygen with inert gas like nitrogen gas or carbon dioxide gas. In the latter method, in order to make it polymerize enough to the grade from which the polymerization conversion of a monomer becomes 99.7 or more, the oxygen concentration of this exposure atmosphere needs to be 5000 ppm or less. It is 300 ppm or less suitably.

[0042]When reacting quickly, heating elasticity of the mold release treatment film and the mold release treatment film for a cover which sandwiched the film-like constituent with the heat of polymerization is carried out, and defects, such as pinstripes, may occur in the adhesive tape obtained. In this case, it is solvable by making it pass, controlling the radiant heat from a lamp by an optical cut off filter, or making a cold plate an exposure side and the sheet back by the side of opposite contact, and cooling.

[0043](OPERATION) Since the percentage of stress relaxation of 20 minutes after [ when a fire-resistant adhesion film is elongated 100% ] is [ this invention ] not less than 50%, even if there is unevenness whose surface of an adherend is comparatively detailed, since a stress when this fire-resistant adhesion film changes according to this adherend, it sticks, and it pastes up and it tears off spreads in the whole and is eased, it is hard to exfoliate, and is a large adhesion film of adhesive strength.

[0044]In the invention according to claim 1, since polyphosphoric acid ammonium, the special nitrogen containing compound, and the metal oxide contain as a flame retarder, it becomes a good fire-resistant adhesion film that it is hard to burn. In the invention according to claim 2, as a flame retarder, since a phosphorus compound and thermal expansion nature graphite contain, it becomes a good fire-resistant adhesion film that it is hard to burn. In the invention according to claim 3, as a flame retarder, since polyphosphoric acid ammonium and/or red phosphorus contain, it becomes a good fire-resistant adhesion film that it is hard to burn.

[0045]In the invention according to claim 4, since the particles or hollow particles of the special size contain in the fire-resistant adhesion film, it becomes large, and it pastes up also to an adherend with comparatively detailed unevenness strongly, and moreover, percentage of stress relaxation does not separate easily and serves as a good adhesion film. In the invention according to claim 5, since the adhesive layer is provided in the whole surface at least, adhesive power serves as adhesive tape which improved further.

[0046]

[Mode for carrying out the invention]Next, an embodiment of the invention is described.

(Embodiment 1) 90 weight sections and acrylic acid for 2-ethylhexyl acrylate Ten weight sections, n-dodecanethiol -- 0.01 weight sections and 2,2-dimethoxy- 2-phenylacetophenone (the Ciba-Geigy make.) a trade name "IRGACURE 651" -- 0.1 weight sections and a high-density-polyethylene particle (Mitsui petrochemical company make.) with a mean particle diameter of 20 micrometers a trade name "MIPERON XM-220" and specific gravity 0.95 -- 20 weight sections and polyphosphoric acid ammonium (the Hoechst A.G. make.) the following "APP" -- saying -- ten weight sections and tris (2-hydroxyethyl) isocyanurate (the Wako Pure Chemical Industries, Ltd. make.) the following "THEIC" -- saying -- nitrogen gas was purged and dissolved oxygen was removed, after carrying out churning mixing in the separable flask and manufacturing a constituent until it distributed five weight sections and titanium oxide (rutile type) (made by Ishihara Sangyo Kaisha, Ltd.) to 2 weight-section homogeneity.

[0047]And viscosity became high, while the monomer in a constituent polymerized and temperature rose, when this constituent was irradiated with ultraviolet radiation with the Wood's glass lamp. Light irradiation was stopped in the place where the temperature of the constituent rose by 5 \*\*. The invert ratio of the partial polymerization thickening constituent obtained as a result was 3.7%, and viscosity was 2200 c.p.s. After adding 0.1 weight sections of hexanediol diacrylate, It covered so that it might coat so that it may become the shape of a film whose thickness at the time of the end of a polymerization is 1.0 mm, and a mold release treated surface might touch the still more nearly same PET film as this coating surface in this coating surface on the mold release treated surface of the PET film of the 38-micrometer thickness which carried out mold release treatment.

[0048]Using the chemical lamp, lamp height was adjusted so that exposure hardness might become 2 mW/cm<sup>2</sup>, and it glared for 8 minutes, and the adhesion film was obtained from on this covered PET film. The residual monomer at this time was 0.1% or less, and the gel fraction was 96%. It was 68% when the length of the adhesion film of the shape of a strip of paper after it elongates 100% in accordance with the measuring method of the above-mentioned percentage of stress relaxation after cutting this adhesion film in the shape of [ 20 mm-wide ] a strip of paper, and 20 minutes pass was measured. Hereafter, it is only described as percentage of stress relaxation (after 20 minutes).

[0049](Embodiment 2) n-butyl acrylate 85 weight section, acrylic acid 15 weight section, Churning mixing of hydrophilic silica (product [ made by Japanese Aerosil ], trade name "Aerosil 200") 3 weight section, APP5 weight section, 1CTHE3 weight section, and the titanium oxide 1 weight section was carried out at 1000 rpm with the dissolver type agitator for 4 hours, and the consistency fluid was obtained. this -- glass balloon 50 weight section (the Asahi Glass Co., Ltd. make.) with a mean particle diameter of 45 micrometers Nitrogen gas was purged and the dissolved oxygen was removed, after carrying out churning mixing until it became 0.1 weight sections about a trade name "CEL-STARZ-27", specific gravity 0.27, and 2.2-dimethoxy- 2-phenylacetophenone and became 0.1 weight-section homogeneity about hexanediol diacrylate. The percentage of stress relaxation (after 20 minutes) of this adhesion film

that manufactured the 1.0-mm-thick adhesion film like Embodiment 1 hereafter was 70%.

[0050](Embodiment 3) 2-ethylhexyl acrylate 70 weight section, isoctyl acrylate 20 weight section, Churning mixing of acrylic acid 10 weight section, hydrophilic silica (product [ made by Japanese Aerosil ], trade name "Aerosil 200") 3 weight section, APP5 weight section, 1CTHE40 weight section, and the titanium dioxide 5 weight section was carried out at 1000 rpm with the dissolver type agitator for 4 hours, and the consistency fluid was obtained. this -- a glass balloon with a mean particle diameter of 45 micrometers -- 50 weight sections (the Asahi Glass Co., Ltd. make.) Nitrogen gas was purged and the dissolved oxygen was removed, after carrying out churning mixing until it became 0.1 weight sections about a trade name "CEL-STARZ-27", specific gravity 0.27, and 2.2-dimethoxy- 2-phenylacetophenone and became 0.1 weight-section homogeneity about hexanediol diacrylate. Hereafter, the 1.0-mm-thick adhesion film was manufactured like Embodiment 1. The percentage of stress relaxation (after 20 minutes) of this adhesive tape substrate was 60%.

[0051]Independently 90 weight sections and acrylic acid for 2-ethylhexyl acrylate Ten weight sections, For n-dodecanethiol 0.05 weight sections and ethyl acetate with 80 weight sections An agitator, After having taught into 5 mouth flask provided with the flowing-back condenser tube, the thermometer, the dropping funnel, and the nitrogen gas feed port, carrying out the churning dissolution and considering it as a homogeneous mixture, nitrogen gas was purged for about 30 minutes, and the oxygen which exists in a monomer solution was removed. Then, temperature rising is carried out, substituting and agitating the air in a flask with nitrogen gas, After the solution which held this at 70 \*\* and was made to dissolve 0.03 weight sections of benzoyl peroxide in the ethyl acetate of one weight section was dropped with the dropping funnel, the polymerization reaction was carried out at a temperature as it is for 10 hours, and the solution of the copolymer was obtained.

[0052]2.4 weight-section (as opposed to copolymer solid content 100 weight section) addition of the ethyl acetate solution (Japanese polyurethane company make, trade name "coronate L55E") of the tolylene diisocyanate addition product of trimethylolpropane was carried out at the solution of the above-mentioned copolymer, it mixed uniformly, and the binder solution was created. This binder solution was coated and dried on the separator so that the thickness at the time of desiccation might be set to 50 micrometers, the adhesive layer was manufactured, this adhesive layer was laminated to both sides of each above-mentioned adhesion film, and adhesive tape was manufactured.

[0053](Comparative example 1) The adhesion film was obtained like Embodiment 1 except not having added 3 component-system flame retarder. The percentage of stress relaxation (after 20 minutes) of the obtained adhesion film was 77%.

[0054](Comparative example 2) The adhesion film was obtained like Embodiment 3 except having made one weight section and THEIC into two weight sections, and having made titanium oxide into one weight section for APP. The percentage of stress relaxation (after 20 minutes) of the obtained adhesion film was 76%.

[0055](Comparative example 3) The adhesion film was manufactured like Embodiment 2 except having made 30 weight sections and THEIC into 40 weight sections, and having made titanium oxide into five weight sections for APP. The percentage of stress relaxation (after 20 minutes) of the obtained adhesion film was 66%.

[0056]The result which evaluated by doing the adhesion film and the 90-degree friction test of a tape, shear-bond-strength examination, and inflammability test which were obtained by Embodiments 1-3 and the comparative examples 1-3 was shown in Table 1.

[0057]

[Table 1]

	90° 剥離力 (g/20mm 幅)	剪断接着力 (kg/cm <sup>2</sup> )	難燃性
実施例 1	8.9	12.5	自消性
実施例 2	8.8	12.5	自消性
実施例 3	11.0	14.5	自消性
比較例 1	9.1	11.5	易燃性
比較例 2	11.8	13.0	逕燃性
比較例 3	4.0	7.5	自消性

[0058]The test method is as follows.

Judge in 20 mm in width of 1 or 90-degree friction test adhesive tape, and length of 150 mm, and, [ under 23 \*\* atmosphere ] [ a stainless plate (25-mm200 mm in length in width, and 2 mm in thickness) (#304) ] Stick one field of adhesive tape adhesion 100 mm in length, and 50-micrometer-thick stainless steel foil (#304) is stuck on the field of another side as an object for backing, After going back and forth two times with a roller 5 kg in weight, after 24hr, it pulled, 300 mm/min pulled using the testing machine, and 90-degree exfoliation power was measured at velocity.

[0059]Cut out 2 and shear-bond-strength examination adhesive tape to 20 mm x 20 mm, and, [ under 23 \*\* and 65%RH atmosphere ] After sticking on the central part between 50 mm x 50 mm, and a 2-mm-thick two-sheet stainless plate (#304) in the shape of sandwiches and being stuck by pressure for 15 minutes by 5-kg load, after 24hr, 50 mm/min pulled and shear bond strength was measured at velocity.

[0060]The inflammable classification was performed based on 3 and fire-resistant examination JIS D 1201.

[0061](Embodiment 4) 90 weight sections and acrylic acid for 2-ethylhexyl acrylate Ten weight sections, For n-dodecanethiol 0.01 weight sections and 2.2-dimethoxy- 2-phenylacetophenone 0.1 weight sections, a high-density-polyethylene particle (Mitsui petrochemical company make.) with a mean particle diameter of 20 micrometers 20 weight sections and APP for a trade name "MIPERON XM-220" and specific gravity 0.95 Ten weight sections, After carrying out churning mixing in the separable flask and manufacturing a constituent until it distributed thermal expansion nature graphite (the Nippon Kasei Chemical Co., Ltd. make, trade name "CA60S") to 5 weight-section homogeneity, dissolved oxygen was removed by purging nitrogen gas. And viscosity became high, while the monomer in a constituent polymerized and temperature rose, when this constituent was irradiated with ultraviolet radiation with the Wood's glass lamp. Light irradiation was stopped in the place where the temperature of the constituent rose by 5 \*\*. The invert ratio of the partial polymerization thickening constituent obtained as a result was 3.7%, and viscosity was 2200 c.p.s.

[0062]After adding 0.1 weight sections of hexanediol diacrylate, On the mold release treated surface of the PET film of the 38-micrometer thickness which carried out

mold release treatment, it coated so that the thickness at the time of the end of a polymerization might become the shape of a film of 1.0, and the still more nearly same PET film as this coating surface was covered so that a mold release treated surface might touch this coating surface. Using the chemical lamp, lamp height was adjusted so that exposure hardness might become 2 mW/cm<sup>2</sup>, and it glared for 8 minutes, and the adhesion film was obtained from on this covered PET film. The residual monomer of this adhesion film was 0.1% or less, and the gel fraction was 95%. The percentage of stress relaxation (after 20 minutes) of this adhesion film was 70%.

[0063](Embodiment 5) n-butyl acrylate 85 weight section, acrylic acid 15 weight section, Five weight sections and thermal expansion nature graphite 8 weight section were carried out at 1000 rpm for 4 hours by hydrophilic silica (product [ made by Japanese Aerosil ], trade name "Aerosil 200") 3 weight section, churning mixing of the APP was carried out with the dissolver type agitator, and the consistency fluid was obtained. this -- a glass balloon with a mean particle diameter of 45 micrometers -- 50 weight sections (the Asahi Glass Co., Ltd. make.) Nitrogen gas was purged and the dissolved oxygen was removed, after carrying out churning mixing until it became 0.1 weight sections about a trade name "CEL-STARZ-27", specific gravity 0.27, and 2.2-dimethoxy- 2-phenylacetophenone and became 0.1 weight-section homogeneity about hexanediol diacrylate. Hereafter, the 1.0-mm-thick adhesion film was obtained like Embodiment 4. The percentage of stress relaxation (after 20 minutes) of this adhesion film was 72%.

[0064](Embodiment 6) 2-ethylhexyl acrylate 70 weight section, isooctyl acrylate 20 weight section, Churning mixing of acrylic acid 10 weight section, hydrophilic silica (product [ made by Japanese Aerosil ], trade name "Aerosil 200") 3 weight section, t-butyl phosphonic acid (made by Aldrich) 40 weight section, and the thermal expansion nature graphite 2 weight section was carried out at 1000 rpm with the dissolver type agitator for 4 hours, and the consistency fluid was obtained. this -- glass balloon 50 weight section (the Asahi Glass Co., Ltd. make.) with a mean particle diameter of 45 micrometers Nitrogen gas was purged and the dissolved oxygen was removed, after carrying out churning mixing until it became 0.1 weight sections about a trade name "CEL-STARZ-27", specific gravity 0.27, and 2.2-dimethoxy- 2-phenylacetophenone and became 0.1 weight-section homogeneity about hexanediol diacrylate. Hereafter, the 1.0-mm-thick adhesion film was obtained like Embodiment 4. The percentage of stress relaxation (after 20 minutes) of this adhesion film was 60%.

[0065]Independently 90 weight sections and acrylic acid for 2-ethylhexyl acrylate Ten weight sections, For n-dodecanethiol 0.05 weight sections and ethyl acetate 80 weight-section agitator, After having taught into 5 mouth flask provided with the flowing-back condenser/tube, the thermometer, the dropping funnel, and the nitrogen gas feed port, carrying out the churning dissolution and considering it as a homogeneous mixture, nitrogen gas was purged for about 30 minutes, and the oxygen which exists in a monomer solution was removed. Then, temperature rising is carried out, substituting and agitating the air in a flask with nitrogen gas, After the solution which held this at 70 \*\* and was made to dissolve 0.03 weight sections of benzoyl peroxide in the ethyl acetate of one weight section was dropped with the dropping funnel, the polymerization reaction was carried out at a temperature as it is for 10 hours, and the solution of the copolymer was obtained. Ethyl acetate solution (Japanese polyurethane company make, trade name "coronate L55E") 2.4 weight section (as opposed to copolymer 100 weight section) of the tolylene diisocyanate addition product of trimethylolpropane was added in the solution of the above-mentioned copolymer, it mixed uniformly, and the binder solution was created. This binder solution was coated and dried on the separator so that the thickness at the time of desiccation might be set to 50 micrometers, the adhesive layer was manufactured, this adhesive layer was

laminated to both sides of the above-mentioned adhesion film, and adhesive tape was obtained.

[0066](Comparative example 4) The adhesion film was obtained like Embodiment 4 except not having added a phosphorus compound and thermal expansion nature graphite. The percentage of stress relaxation (after 20 minutes) of the obtained adhesion film was 77%.

[0067](Comparative example 5) Adhesive tape was obtained like Embodiment 6 except having made three weight sections and thermal expansion nature graphite into one weight section for APP. The percentage of stress relaxation (after 20 minutes) of the obtained adhesive tape was 76%.

[0068](Comparative example 6) The adhesion film was obtained like Embodiment 5 except having made 30 weight sections and thermal expansion nature graphite into 20 weight sections for APP. The percentage of stress relaxation (after 20 minutes) of the obtained adhesive tape was 55%.

[0069]The result which evaluated by doing the 90-degree friction test of the adhesive tape obtained by Embodiments 4-6 and the comparative examples 4-6, a shear-bond-strength examination, and an inflammability test was shown in Table 2.

[0070]

[Table 2]

	90° 剥離力 (g/20mm 幅)	剪断接着力 (kg/cm <sup>2</sup> )	難燃性
実施例 4	8. 9	13. 8	自消性
実施例 5	8. 5	13. 8	自消性
実施例 6	11. 0	15. 9	自消性
比較例 4	9. 2	13. 8	易燃性
比較例 5	10. 7	14. 8	逕燃性
比較例 6	6. 8	8. 6	自消性

[0071](Embodiment 7) 90 weight sections and acrylic acid for 2-ethylhexyl acrylate Ten weight sections, For n-dodecanethiol 0.01 weight sections and 2.2-dimethoxy-phenylacetophenone 0.1 weight sections, a high-density-polyethylene particle (Mitsui petrochemical company make.) with a mean particle diameter of 20 micrometers Nitrogen gas was purged and dissolved oxygen was removed, after carrying out churning mixing in the separable flask and manufacturing a constituent until it distributes a trade name "MIPERON XM-220" and specific gravity 0.95 to 20 weight sections and distributed red phosphorus (phosphorus chemical industry company make, trade name "NOBA red 120") to 5 weight-section homogeneity. And viscosity became high, while the monomer in a constituent polymerized and temperature rose, when this constituent was irradiated with ultraviolet radiation with the Wood's glass lamp. Light irradiation was stopped in the place where the temperature of the constituent rose by 5 \*\*. The invert ratio of the partial polymerization thickening

constituent obtained as a result was 3.7%, and viscosity was 2200 c.p.s.

[0072]After adding 0.1 weight sections of hexanediol diacrylate, It covered so that it might coat so that it may become the shape of a film whose thickness at the time of the end of a polymerization is 1.0 mm, and a mold release treated surface might touch the still more nearly same PET film as this coating surface in this coating surface on the PET film of the 38-micrometer thickness which carried out mold release treatment. Using the chemical lamp, lamp height was adjusted so that exposure hardness might become 2 mW/cm<sup>2</sup>, and it glared for 8 minutes, and the adhesion film was obtained from on this covered PET film. The residual monomer of this adhesion film was 0.1% or less, and the gel fraction was 95%. The percentage of stress relaxation (after 20 minutes) of this adhesion film was 70%.

[0073](Embodiment 8) 15 weight sections and hydrophilic silica (the product made by Japanese Aerosil, a trade name "Aerosil 200") were carried out by three weight sections, churning mixing of the APP was carried out [ n-butyl acrylate ] for 85 weight sections and acrylic acid at 1000 rpm with 60 weight-section dissolver type agitator for 4 hours, and the consistency fluid was obtained. this -- glass balloon 50 weight section (the Asahi Glass Co., Ltd. make.) with a mean particle diameter of 45 micrometers Nitrogen gas was purged and the dissolved oxygen was removed, after carrying out churning mixing until it became 0.1 weight sections about a trade name "CEL-STARZ-27", specific gravity 0.27, and 2.2-dimethoxy- phenylacetophenone and became 0.1 weight-section homogeneity about hexanediol diacrylate. Hereafter, the 1.0-mm-thick adhesion film was manufactured like Embodiment 7. The percentage of stress relaxation (after 20 minutes) of this adhesion film was 60%.

[0074](Embodiment 9) 2-ethylhexyl acrylate 70 weight section, isoctyl acrylate 20 weight section, Churning mixing of acrylic acid 10 weight section, hydrophilic silica (product [ made by Japanese Aerosil ], trade name "Aerosil 200") 3 weight section, APP6 weight section, and the red phosphorus 5 weight section was carried out at 1000 rpm with the dissolver type agitator for 4 hours, and the consistency fluid was obtained. this -- a glass balloon with a mean particle diameter of 45 micrometers -- 50 weight sections (the Asahi insulator company make.) Nitrogen gas was purged and the dissolved oxygen was removed, after carrying out churning mixing until it became 0.1 weight sections about a trade name "CEL-STARZ-27", specific gravity 0.27, and 2.2-dimethoxy- phenylacetophenone and became 0.1 weight-section homogeneity about hexanediol diacrylate. Hereafter, the 1.0-mm-thick adhesion film was manufactured like Embodiment 7. The percentage of stress relaxation (after 20 minutes) of this adhesion film was 75%.

[0075]Independently 90 weight sections and acrylic acid for 2-ethylhexyl acrylate Ten weight sections, After having taught into 5 mouth flask which was provided with 0.05 weight sections for n-dodecanethiol, and was provided with 80 weight-section agitator, the flowing-back condenser tube, the thermometer, the dropping funnel, and the nitrogen gas feed port for ethyl acetate, carrying out the churning dissolution and considering it as a homogeneous mixture, nitrogen gas was purged for about 30 minutes, and the dissolved oxygen was removed. Then, temperature rising is carried out, substituting and agitating the air in a flask with nitrogen gas, After the solution which held this at 70 \*\* and was made to dissolve 0.03 weight sections of benzoyl peroxide in the ethyl acetate of one weight section was dropped with the dropping funnel, the polymerization reaction was carried out at a temperature as it is for 10 hours, and the solution of the copolymer was obtained. 2.4 weight-section (as opposed to copolymer solid content 100 weight section) addition of the ethyl acetate solution (Japanese polyurethane company make, trade name "coronate L55E") of the tolylene diisocyanate addition product of trimethylolpropane was carried out at the solution of the above-mentioned copolymer, it mixed uniformly, and the binder solution was created. This binder solution was coated and dried on the separator so that the thickness at the time of desiccation might be set to 50 micrometers, the adhesive layer

was manufactured, this adhesive layer was laminated to both sides of the above-mentioned adhesion film, and adhesive tape was manufactured.

[0076](Comparative example 7) The adhesion film was obtained like Embodiment 7 except not having added APP and red phosphorus. The percentage of stress relaxation (after 20 minutes) of the obtained adhesion film was 75%.

[0077](Comparative example 8) The adhesion film and the tape were obtained like Embodiment 9 except having made APP into two weight sections and having made red phosphorus into 0.5 weight sections. The percentage of stress relaxation (after 20 minutes) of the obtained adhesion film was 76%.

[0078](Comparative example 9) The adhesion film was obtained like Embodiment 8 except having made APP into 80 weight sections. The percentage of stress relaxation (after 20 minutes) of the obtained adhesion film was 66%.

[0079]The result which evaluated by doing the adhesion film and the 90-degree friction test of a tape, shear-bond-strength examination, and inflammability test which were obtained by Embodiments 7-9 and the comparative examples 7-9 was shown in Table 3.

[0080]

[Table 3]

	90° 剥離力 (g/20mm 幅)	剪断接着力 (kg/cm <sup>2</sup> )	難燃性
実施例 7	7. 8	15. 5	自消性
実施例 8	7. 4	14. 8	自消性
実施例 9	10. 0	18. 1	自消性
比較例 7	8. 2	16. 8	易燃性
比較例 8	10. 0	17. 9	逕燃性
比較例 9	6. 8	8. 8	自消性

[0081]

[Effect of the Invention] Since the copolymer in which the carbon number of an alkyl group copolymerizes a copolymerizable monomer with the alkyl (meta) acrylate of 4-14 and this alkyl (meta) acrylate is fabricated in the shape of a film in this invention, by it, it becomes a good adhesion film. Since the percentage of stress relaxation of 20 minutes after [ when this fire-resistant adhesion film is elongated 100% ] is [ this invention ] not less than 50%, even if comparatively detailed unevenness is on the surface of an adherend, Since a stress when the constituent of the shape of this film changes according to this adherend, it sticks, and it pastes up and it tears off spreads in the whole and is eased, it is hard to exfoliate, and it is a large adhesion film of adhesive strength.

[0082]In the invention according to claim 1, since polyphosphoric acid ammonium, the special nitrogen containing compound, and the metal oxide contain as a flame retarder, it becomes a good fire-resistant adhesion film that it is hard to burn. In the

invention according to claim 2, as a flame retarder, since a phosphorus compound and thermal expansion nature graphite contain, it becomes a good fire-resistant adhesion film that it is hard to burn. In the invention according to claim 3, as a flame retarder, since polyphosphoric acid ammonium and/or red phosphorus contain, it becomes a good fire-resistant adhesion film that it is hard to burn. Thus, since the invention according to claim 1 to 3 does not contain halogen, it does not generate smoke harmful at the time of combustion, it does not have the corrosiveness to an instrument, and the hazardous property to a human body, and is very useful.

[0083]In the invention according to claim 4, since the particles or hollow particles of the special size contain in the above-mentioned fire-resistant adhesion film, it becomes large, and it pastes up also to an adherend with comparatively detailed unevenness strongly, and moreover, percentage of stress relaxation does not separate easily and serves as a good fire-resistant adhesion film. In the invention according to claim 5, since the adhesive layer is provided in the whole surface at least, adhesive power serves as fire-resistant adhesive tape which improved further.

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[Translation done.]

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